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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/587,489	07/27/2006	Akira Fujiki	040356-0593	2279

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FOLEY AND LARDNER LLP  
SUITE 500  
3000 K STREET NW  
WASHINGTON, DC 20007

EXAMINER
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ORLANDO, MICHAEL N

ART UNIT	PAPER NUMBER
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4123

MAIL DATE	DELIVERY MODE
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11/21/2007

PAPER

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

<b>Office Action Summary</b>	<b>Application No.</b> 10/587,489	<b>Applicant(s)</b> FUJIKI ET AL.	
	<b>Examiner</b> Michael N. Orlando	<b>Art Unit</b> 4123	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 27 July 2006.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 8-14 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 8-14 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All    b) ☐ Some \*    c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)            | 4) <input type="checkbox"/> Interview Summary (PTO-413)           |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)   | Paper No(s)/Mail Date. _____                                      |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date <u>7/27/2006</u> .   | 6) <input type="checkbox"/> Other: _____                          |

## **DETAILED ACTION**

### ***Claim Rejections - 35 USC § 112***

1. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

2. Claim 10 is rejected under 35 U.S.C. 112, second paragraph, as being incomplete for omitting essential steps, such omission amounting to a gap between the steps. See MPEP § 2172.01. The omitted steps are: The teaching that the absence of an adhesive allows for the adhesion of the gas diffusion layers to the membrane. In particular for claim 10 it seems to be contradictory to claim 11 in respects to requiring an adhesive to facilitate the bonding of the gas diffusion layers to the electrolyte membrane. The examiner fails to find evidence to suggest that the adhesion can be adequately accomplished without the adhesive identified in claim 11. Claim 10 is suggestive of an adhesion being accomplished through the catalyst layers bonding directly to the gas diffusion layers.

### ***Claim Rejections - 35 USC § 102***

3. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

4. Claim 8, 9 and 12 are rejected under 35 U.S.C. 102(b) as being anticipated by Suenaga et al. (US 2002/0051902 A1).

Regarding claims 8 and 9, Suenaga et al. teaches a polymer electrolyte fuel cell comprising separator plates layered on both sides of a membrane electrode assembly. The membrane assembly comprises an electrolyte membrane held by gas-diffusion electrode plates (i.e. gas diffusion layers) on either side. The separator plates of reference are further taught to contain grooved gas passages for either fuel gas passage, oxidizing gas passage or coolant flow, whereby the gas passages (grooves) are contacted with the gas diffusion electrode plates ([0004]). Suenaga et al. further teaches that sealing a separator plate is accomplished by the same methods as sealing gas-diffusion electrode plates to an electrolyte membrane (i.e. adhesive and hot press with dies) ([0020]). It is recognized by the examiner that the adhesive taught by Suenaga et al. is not restricted to certain portions of the junction between the separator plate and the gas-diffusion electrode plates and therefore would include application at the partition walls among other locations. It is further recognized by the examiner that the terms jig and die are equivalents when taken in context.

Regarding claim 12, Suenaga et al. teaches the method of claim 8 as seen above. Furthermore, it is taught by Suenaga et al. that the seal may be formed from elastomers that require heating for vulcanization (i.e. thermosetting) ([0019]).

### ***Claim Rejections - 35 USC § 103***

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

6. The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

7. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

8. Claims 13 and 14 are rejected under 35 U.S.C. 103(a) as being unpatentable over Suenaga et al. (US 2002/0051902 A1) .

Regarding claim 13 and 14, Suenaga et al. teaches the method of claim 8 as seen above. Suenaga further teaches that the separator plates have a plural of gas passages ([0004]) and each of the gas passages (coolant, fuel gas, oxidizing gas) are sealed from one another. The coolant passage is further taught to be on the outer surface of the separator plate (i.e. the surface that would face the pressing dies) ([0006]). Suenaga et al. further teaches that the dies possess convex/concave portions

to match the concave/convex portions of the article being pressed (figure 1E, reference number 40). It is recognized by the examiner that a “passage” taken in the context of the teachings would have been inherently defined by a concavity since coolant would not flow or be maintained by convex portions.

Suenaga et al. fails to explicitly teach that the pressing jigs (i.e. dies) have convex portions that compliment the inherent concavities of the separator plates.

It would have been obvious to one of ordinary skill in the art at the time of the invention to modify the invention taught by Suenaga et al. to specifically utilize jigs (i.e. dies) that contain convex portions to match the concave portions (grooves) of the separator plates because it would have been realized that such a matching of convex/concave portions would have allowed for a more even compression, which would in turn would have been recognizably beneficial towards effecting a strong adhesion at all locations and such a complementation had already been taught by Suenaga et al. in the construction of the electrolyte assembly.

9. Claims 10 and 11 are rejected under 35 U.S.C. 103(a) as being unpatentable over Suenaga et al. (US 2002/0051902 A1) in view of Debe et al. (US 2003/0041444 A1).

Regarding claims 10 and 11, the method of claim 8 is taught as seen above. Suenaga et al. further teaches that pressure and heat is applied to the separators by pressing jigs (referred by dies) and that such causes the fuel cell to become integral as is specifically discussed in claim 8 seen above.

Suenaga et al. fails to teach the utilization of catalyst layers as a coating applied to the membrane, but rather teaches the catalyst layers (anode, cathode) as electrode plates. Suenaga et al. further fails to teach that through the use of an adhesive applied specifically in certain locations on the gas diffusion layer facing the catalyst layers, pressing jigs can be used against the separators on the outside to create an integral polymer electrolyte fuel cell.

Debe et al. teaches various methods of attachment for the gas diffusion layer (referred by electrode backing layers with gas transport properties) to the membrane, and moreover one which specifically utilizes a limited area adhesive attachment between the two ([0142]).

The examiner takes official notice to the fact that it would have been obvious to one of ordinary skill in the art at the time of the invention to have utilized a coating rather than an electrode plate as the catalyst layer because such was a well known substitute and furthermore a coating would have provided for a quick method of manufacturing requiring less mechanical output to apply (a plate would weigh more and necessitate more power output to align). It would have also been obvious to one of ordinary skill in the art at the time of the invention to have modified the invention of Suenaga et al. to further include utilizing an adhesive in certain locations to secure the gas diffusion layers to the membrane in view of Debe et al. because such was known to avoid blocking all pores (i.e. better gas flow) ([0142]). Furthermore, it is recognized by the examiner that Suenaga et al. in view of Debe et al. discloses the claimed invention except for the pressure applied to the separators (the outermost component) resulting in

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the fuel cell becoming integral in a single step as opposed to such being accomplished in a two step process. It would have been obvious to one having ordinary skill in the art at the time the invention was made to have created an integral fuel cell in one step, since it has been held that forming in one piece an article which has formerly been formed in two pieces and put together involves only routine skill in the art. *Howard v. Detroit Stove Works*, 150 U.S. 164 (1893).

### ***Conclusion***

10. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Kuroki et al. (US 2004/0137303 A1), Mizuno (US 2001/0049047 A1), Baars et al. (US 2004/0076863 A1), and Tanahashi et al. (US 2002/0192538 A1).

11. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Michael N. Orlando whose telephone number is (571)-270-5038. The examiner can normally be reached on Monday-Friday, 7:30am-5:00pm, alternate Fridays.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Joseph Del Sole can be reached on (571)272-1130. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.



Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

MO

/Joseph S. Del Sole/  
Supervisory Patent Examiner, Art Unit 4123